BOCHKOV, Yu.N., inzh.

Determination of output according to the settling and efficiency of screw settling centrifuges in relation to the physical properties of coal fines. Obog.i brik.ugl. no.30:58-64 '63.

(MIRA 17:4)

L 15929-66

ACC NR: AP6004423   SOURCE CODE: UR/0051/66/020/001/0183/0184

AUTHOR: Bochkov, Yu. V.; Georgobiani, A. N.; Gershun, A. S.; Sysoyev, L. A.;
Chilaya, G. S.

ORG: none

TITLE: Ultraviolet electroluminescence of zinc sulfide

SOURCE: Optika i spektroskopiya, v. 20, no. 1, 1966, 183-184

TOPIC TAGS: electroluminescence, zinc sulfide, single crystal, UV radiation

ABSTRACT: Ultraviolet electroluminescence was observed in pure single crystals of
zinc sulfide grown from a melt under inert gas pressure. Specimens 150 µ thick were
subjected to pulsed voltage with an amplitude of 4.5 kv, a duration of 1.7 µsec and
a duty factor of $1.5 \cdot 10^4$. The voltage was applied through indium electrodes. The
luminescence of the specimens is stable at a constant voltage and increases approxi-
mately exponentially with voltage. A voltage increase from 2.7 to 4.5 kv increases
the luminescence intensity by approximately one order of magnitude. It is assumed
that this luminescence is due to recombination of electron-hole pairs created by

Card 1/2   UDC: 535.376-3

L 15929-66
ACC NR: AP6004423

electric discharge in the crystal. There is a sharp cutoff in luminescence at 330 mμ due to the natural absorption of the crystal lattice. It is shown that this emission could not be caused by air breakdown in microcracks. Orig. art. has: 1 figure.

SUB CODE: 20/ SUBM DATE: 27Jul65/ ORIG REF: 001/ OTH REF: 000

Card 2/2

L 26360-66   EWT(1)/EWT(m)/T/EWP(t)   IJP(c)   JD

ACC NR: AP6012501   SOURCE CODE: UR/0181/66/008/004/1273/1275

AUTHOR: Bochkov, Yu. V.; Georgobiani, A. N.; Chilaya, G. S.

ORG: Physics Institute im. P. N. Lebedev AN SSSR, Moscow (Fizicheskiy institut AN SSSR)

TITLE: Some electrical characteristics of zinc sulfide single crystals

SOURCE: Fizika tverdogo tela, v. 8, no. 4, 1966, 1273-1275

TOPIC TAGS: zinc sulfide, single crystal, electric property, crystal anisotropy

ABSTRACT: The authors study the electrical characteristics of large ZnS single crystals grown from the melt at 850°C under inert gas pressure by a new method developed under the direction of L. A. Sysoyev. These are hexagonal crystals with no traces of cubic structure so that contact and surface phenomena have no effect on the electrical measurements. The specimens studied had dimensions of 4 × 48 mm. The temperature curve for electrical conductivity is approximated by two straight lines in $\ln \sigma$ and $1/T$ coordinates. The slope of the low-temperature line corresponds to an activation energy of 1.25 ± 0.07 ev, while the high-temperature section corresponds to an energy of 1.6 ± 0.06 ev. This section may probably be attributed to natural conductivity since data in the literature give the thermal width of the forbidden band as 3.2 ± 0.2 ev. Extrapolation of the low-temperature section to room temperature gives

Card 1/2

L 26360-66

ACC NR: AP6012501

an estimated resistivity of $\sim 10^{20}$ $\Omega \cdot cm$. The degree of compensation was calculated at 10^{-2}. It was found that the electrical conductivity parallel to axis C_6 was no more than 2-3 times as great as that perpendicular to this axis. Photoconductive aniso-tropy was found to be 1.5. This contradicts the work of Limpicki et al. (A. Limpicki, P. R. Frankl, V. A. Brophy, *Phys. Rev.*, 107, 1238, 1957). In conclusion we thank M. V. Fok for discussing the results, L. A. Sysoyev for furnishing the zinc sulfide crystals and V. K. Kostin for assistance in preparation of the specimens. Orig. art. has: 1 figure.

SUB CODE: 20/   SUBM DATE: 05Aug65/   ORIG REF: 004/   - OTH REF: 011

Card 2/2

L 39773-66 EWT(m)/EWP(t) IJP(c) JD/GD-2

ACC NR: AP6013068   SOURCE CODE: UR/0048/66/030/004/0628/0632

AUTHOR: Bochkov,Yu.V.; Georgobiani, A.N.; Kisil',I.I.; Sysoyev,L.A.; Chilaya,G.S.

ORG: Physical Institute im. P.N.Lebedev, Academy of Sciences, SSSR (Fizicheskiy institut Akademii nauk SSSR)

TITLE: Electroluminescence of bulk ZnS crystals /Report, Fourteenth Conference on Luminescence held in Riga, 16-23 September 1965/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 4, 1966, 628-632

TOPIC TAGS: electroluminescence, zinc sulfide, semiconducting material, luminophor, single crystal, single crystal growth

ABSTRACT: The study was undertaken in view of the growing interest in II-VI semi-conductors as representatives of the class of compounds with a broad forbidden band. Zinc sulfide belongs in this category and is the most thoroughly studied electro-luminophor. However, most previous investigations of this electroluminophor did not satisfy the basic conditions for electric measurements on semiconductors: absence of surface effects and adequate uniformity of the specimens. For the present work the single crystals were grown from a melt in an inert gas by the Stockbarger technique; the crystallization was realized at 1850° C to insure growth of hexagonal specimens. A characteristic of the single crystals was pronounced cleavage along the (1120) planes; the single crystals were up to 30 mm in diameter and 100 mm long. Chemical analysis

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L 39773-66

ACC NR: AP6013068

showed that the crystals contained the following impurities: Cu about 10^{-4}%, Ni about 5×10^{-6}%, Fe about 10^{-4}%, Mn about 5×10^{-6}%, SO_4^{2-} under 10^{-4}%, and oxides under 10^{-4}%. The specimen plates were prepared as follows: the crystals were first oriented with reference to the cleavage plane and then wafers measuring 3×3 mm and 2 mm thick were cut by means of a corundum disk. The wafers were etched in acid and provided with ohmic contacts to eliminate surface effects. In the experiments measures were taken to minimize heating; these consisted in providing good heat conduction and using short exciting pulses (1.7 microsec) and a very low duty factor. The electroluminescence peaks at about 460 mμ; the brightness is a linear function of the applied voltage. Further data are given on the ultraviolet electroluminescence spectrum of purer crystals. The experimental results are discussed in general terms; the emission is attributed to interband recombination. In conclusion, we desire to thank M.V.Fok for discussion of the results and valuable suggestions in the course of the work, V.K.Kostin for assistance in preparing the crystals, and A.N.Savin and G.G.Stolpovskiy for help in adjusting the electronic equipment. Orig. art. has: 4 figures.

SUB CODE: 20/   SUBM DATE: 00/   ORIG REF: 003/   OTH REF: 004

Card 2/2/MLP

BOCHIKOVA, A.K.; OSTROVSKIY, G.D.; RABY, Ye.A.; BGANTSEVA, I.V.

Study of the effectiveness of vaccination with live poliovirus vaccine in Pskov and Novgorod Provinces; epidemiological, immunological and virological data during 1961-1962. Trudy Len. inst. epid. i mikrobiol 26:96-110 '64.

(MIRA 18:12)

1. Iz Instituta epidemiologii i mikrobiologii imeni Pastera, Leningrad i iz Pskovskoy i Novgorodskoy oblastnykh sanitarno-epidemiologicheskikh stantsiy.

BOCHKOVA, L. M.

USSR/Medicine - Paratyphoid A   Nov-Dec 52

"Clinical Picture of Paratyphoid A in Children,"
L. M. Bochkova, Chair of Communicable Diseases,
Leningrad State Inst of Pediatrics

"Voprosy Pediatrii Okhrany Materinstva i Detstva"
No 6, pp 52-54

Incidence of paratyphoid A was observed in 5.1%
of all salmonellae infections. This disease is
rare in children. This disease is
more often in children up to one year of age; it is found
15. Early diagnosis and prompt hospitalization of
patients is hindered by the fact that the clinical

symptoms of paratyphoid A are not constant. Symp-
toms of paratyphoid A are similar to those of ap-
pendicitis and cholecystitis and its clinical course
is analogous to typhoid. The percentage of posi-
tive hemocultures in children is the same as in
adults, which makes this method of diagnosis very
valuable for early detection of the disease.

PA 243T24

243T24

243T24

BOCHKOVA, L. M., Candidate Med Sci (diss) -- "Paratyphus (salmonellosis) in children". Leningrad, 1959. 23 pp (Leningrad Pediatric Med Inst), 250 copies (KL, No 22, 1959, 120)

BOCHKOVA, L.M.

Clinical aspects of group S salmonellosis in children. Pediatriia
37 no.5:46-52 My '59
(MIRA 12:8)

1. Iz kafedry infektsionnykh bolezney (zav. - prof. Ye.S. Gurevich)
Leningradskogo pediatricheskogo meditsinskogo instituta i bol'nitsy
imeni S.P. Botkina v Leningrada (glavnyy vrach M.M. Figurina).
   (SALMONELLA INFECTIONS, in inf. & child
       clin. aspects of group S infect. (Rus))

BOCHKOVA, L.M.

Salmonella infections caused by S. typhimurium in children.
Pediatriia no.2:22-27 '62.

(MIRA 15:3)

1. Iz kafedry infektsionnykh bolezney (zav. - prof. Ye.S.
Gurevich) Leningradskogo pediatricheskogo meditsinskogo insti-
tuta na baze bol'nitsy imeni S.P. Botkina v Leningrade (glavnyy
vrach M.M. Figurina).
      (SALMONELLA TYPHUMURIUM) (CHILDREN—DISEASES)

GUREVICH, Ye.S., prof.; BOCHKOVA, L.M., kand.med.nauk

Recovery, catamnesis and late sequelae in Botkin's disease
resulting in a hepatic coma and toxic dystrophy of the liver.
Trudy LPMI 30:90-101 '63.

(MIRA 18:3)

1. Kafedra infektsionnykh bolezney (zav. prof. Ye.S.Gurevich)
Leningradskogo pediatricheskogo meditsinskogo instituta (rektor
dotsent Ye.P.Semenova).

BOCHKOVA, L.M., kand.med.nauk

Activity of transaminases in the blood serum and their clinical importance in Botkin's disease and in jaundices of a different etiology. Trudy LPMI 30:130-138 '63.

Clinical aspects of chronic forms of epidemic hepatitis (Botkin's disease). Ibid.:187-195

(MIRA 18:3)

1. Kafedra infektsionnykh bolezney (zav. prof. Ye.S.Gurevich) Leningradskogo pediatricheskogo meditsinskogo instituta (rektor dotsent Ye.P.Semenova).

BOCHKOVA, L.N

AUTHORS: Entelis, F. S., Bochkova, N. V.

TITLE: SOV/72-58-8-11/17

New Technological Scheme for the Continuous Production of
Porcelain Teapots (Novaya tekhnologicheskaya skhema potochnogo
proizvodstva farforovykh chaynikov)

PERIODICAL: Steklo i keramika, 1958, Nr 8, pp. 33-36 (USSR)

ABSTRACT: In 1955 N. M. Al'tshuller, collaborator of the GIKI, sugges-
ted a new technological scheme (Fig 1) which was to make it
possible to produce 2ooo teapots per shift on the assembly
line with not more than 14 workers. It dealt with the con-
struction of a special complicated conveyer belt for pre-
drying the raw products. This fact as well as the presence of
a great number of hand work to be done and a comparatively
small output caused the authors to look for other ways. Ex-
periments showed that for pre-drying of the unfinished pieces
in the molds the conveyer-belt convection dryers can be used
which are frequently used in porcelain factories. Also the
drilling of the sieve of the teapot could be carried out im-
mediately after the unfinished piece has been knocked out from
the mold. After adding the snout and the handle the final drying

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New Technological Scheme for the Continuous Production
of Porcelain Teapots   SOV/72-58-8-11/17

could be done in the same dryer at a temperature of from
70 to 80° in the course of 3 hours. Based on these experiments
a relatively simple scheme for the continuous production of
teapots and sugar basins could be developed. A rational divi-
sion of the work into certain sections made it also possible
to increase the output per worker. In 1956 the State
Scientific Research Institute for Ceramics (Gosudarstvennyy
nauchno-issledovatel'skiy keramicheskiy institut) worked out
a project for a continuous production of 2000 teapots per shift
with the above mentioned experimental results being fully
used in it. 10 workers are employed for the conveyer belt.
The operation cycle from molding to finishing takes 5-5.5
hours instead of the hitherto used 72 hours. The first con-
tinuous production of this kind was started at the Dmitrovskiy
Porcelain Factory (Fig 2) as may be seen from the work by
L. G. Reznikov (Ref 1). Thanks to the delivery of special
dryers for teapots and sugar basins of the "Türingen" type
(Tyuringiya) the output of teapots and sugar basins could be
increased to 6000 pieces per shift. At the PervomayskiyFactory
2 lines for 800 big and 250 small teapots were installed.

Card 2/3

New Technological Scheme for the Continuous Production
of Porcelain Teapots   SOV/72-58-8-11/17

(Fig 3). The Institute designed a continuous production line
for 5ooo teapots per shift for the Dulevskiy Factory (Fig 4),
and for the "Proletariy" porcelain factory one for 2ooo pieces
per shift (Fig 5). The technical and economic comparative data
of the various methods of the production of teapots are men-
tioned in the table. There are 5 figures, 1 table, and 1
reference,   which is Soviet.

1. Galleys--Equipment   2. Industrial production--Development

Card 3/3

ZHIBAREV, Pavel Borisovich; ANTONOV, V., red.; BOCHKOVA, O., mladshiy
red.; CHEPELEVA, O., tekhn.red.

[V.I.Lenin and the electrification of the Soviet state] Lenin
i elektrifikatsiia Sovetskoi strany. Moskva, Izd-vo sotsial'no-
ekon.lit-ry, 1960. 230 p.
(Lenin, Vladimir Il'ich, 1870-1924) (Electrification)
(MIRA 13:12)

USSR/ Physics - Analysis methods

Card 1/1   Pub. 43 - 13/97

Authors   : Bochkova, O. P.

Title   : Absorption method for the analysis of two-component gas mixtures

Periodical : Izv. AN SSSR, Ser. fiz. 18/2, page 252, Mar-Apr 1954

Abstract   : The installation utilized during the analysis of two-component gas mixtures, by means of the absorption method, is briefly described. The absorption method was tested on helium - argon, helium - nitrogen, neon - nitrogen and ergon - nitrogen mixtures by changing the A and N admixtures. It was found that the concentration of excited atoms in inert gases (metastable) decreases with the increase in concentration of admixtures having lower excitation and ionization potentials. The accuracy of this method is described.

Institution : The A. A. Zhdanov State University, Physics Institute, Leningrad

Submitted : . . . .

BOCHKOVA, Ol'ga Pavlovna; SHREYDER, Yelena Yakovlevna; FRISH ,S.E.,
professor, redaktor; ORLOVA,L.I., redaktor; BOLCHOK,K.M.,
tekhnicheskiy redaktor

[Spectrum analysis of gaseous mixtures] Spektral'nyi analiz
gazovykh smesei. Pod red. S.E.Frisha. Moskva, Gos. izd-vo
tekhniko-teoret. lit-ry, 1955. 183 p.   (MIRA 9:2)

1. Chlen-korrespondent AN SSSR (for Frish)
                        (Gases--Spectra)

BOCHKOVA, O. P.

3539. Use of the "stecloscope" for semi-quantitative spectrographic analysis of mixtures of gases. O. P. Bochkova and E. Ya. Shreider (*Zavod. Lab.*, 1955, 21 (3), 311-312).—Contents of from 0·001 to 1 per cent. of Ne in He are determined by creating in a quartz tube containing the gases a discharge between external electrodes, and observing the relative intensities of the lines Ne 6402 A and He 6678 A with a seven-step sector.

G. S. Smith

Bochkova, Ol'ga P. and Shreider, Elena Ya : Spectral
nyi analiz gazovykh smesei (Spectral Analysis of Gaseous
Mixtures). Moscow: Gosudarst. Izdatel. Tekh.-Teoret
Lit. 1955. 183 pp. il., K, 75.

BOCHKOVA,O.P.; SHREYDER,Ye.Ya.

Use of impulse discharges for the spectrum analysis of gas mixtures. Izv. AN SSSR. Ser. fiz. 19 no.1:75-76 Ja-F '55.

(MIRA 8:9)

1. Fizicheskiy institut Lenigradskogo gosudarstvennogo universiteta imeni A.A.Zhdanova

(Spectrum analysis) (Spectrometer)

Spectral analysis of gases at near-atmospheric pressures. O. P. Bochkova and E. Ya. Shreider. *Vestnik Leningrad. Univ. 11, No. 10, Ser. Fiz. i Khim. No. 3, 57-63(1956).* — The elec.-spark method was developed for the detn. of gaseous mixts. At atm. pressure the concn. of inert gases in the air can be measured to as low as 0.1%. O and N in inert gases can be measured to $10^{-4}\%$ with a high-frequency discharge at near-atm. pressures. At pressures slightly above the atm., the sensitivity of the method increased 100-fold. The mean square error was <10%. An auto-culminating spectrograph with a dispersion of 20A./mm. in the λ 4800A. region was used. The equipment and circuit are described. A. P. Kotloby

BOCHKOVA, O.P., kand.fiz.-mat.nauk; RAZUMOVSKAYA, L.P., inzh.;
SAGAYDAK, V.G., inzh.

Photoelectric method for the determination of nitrogen in
argon. Kislorod 10 no.4:24-27 '57.   (MIRA 11:2)
                    (Nitrogen--Analysis)
                    (Argon--Analysis)
                    (Photoelectric measurements)

Bochkova, O. P.

SOV/1700

PHASE I BOOK EXPLORATION

Lvov. Universitet

28(7)

Materialy X Vsesoyuznogo soveshchanija po spektroskopii, 1956.
t. II: Atomnaya spektroskopiya.(Materials of the 10th All-Union
Conference on Spectroscopy, 1956. Vol 2: Atomic Spectroscopy)
[Lvov] Izd-vo L'vovskogo univ., 1958. 568 p. (Series: Its:
Vizdahchiy sbirnik, vyp.4(9)) 3,000 copies printed.

Additional Sponsoring Agency: Akademiya nauk SSSR. Komissiya po
spektroskopii.

Editorial Board: O.S. Landsberg, Academician, (Resp. Ed.);
B.I. Bogomat, Doctor of Physical and Mathematical Sciences;
I.L. Fabelinskiy, Doctor of Physical and Mathematical Sciences;
V.L. Fabrikant, Doctor of Physical and Mathematical Sciences;
V.G. Koritskiy, Candidate of Technical Sciences;
Candidate of Physical and Technical Sciences; S.M. Rayskiy,
Candidate of Physical and Mathematical Sciences; L.K. Klimovskaya,
(Deceased), Doctor of Physical and Mathematical Sciences; V.S. Miliyanchuk;
Liuberman, Doctor of Physical and Mathematical Sciences; A.Ye.
M.; S.L. Gazer; Tech. Ed.; T.V. Saranyuk.

PURPOSE: This book is intended for scientists and researchers in
the field of spectroscopy, as well as for technical personnel
using spectral analysis in various industries.

COVERAGE: This volume contains 177 scientific and technical studies
of atomic spectrography presented at the 10th All-Union Confer-
ence on Spectroscopy in 1956. The studies were carried out by
members of scientific and technical institutes and include
extensive bibliographies of Soviet and other sources. The
studies cover many phases of spectroscopy; spectra of rare earths,
electromagnetic radiation, physicochemical methods for controlling
uranium production, physics and technology of gas discharge,
optics and spectroscopy, abnormal dispersion in metal vapors,
spectroscopy and the combustion theory, spectrum analysis of ores
and minerals, photographic methods for quantitative spectrum
analysis of metals and alloys, spectral determination of the
hydrogen content of metals by means of isotopes, tables, and
atlases of spectral lines, spark spectrographic analysis,
statistical study of variation in the parameters of calibration
curves, determination of traces of metals, spectrum analysis in
metallurgy, thermochemistry in metallurgy, and principles and
practice of spectrochemical analysis.

Card 2/31

Materials of the 10th All-Union Conference (Cont.)   SOV/1700

Zaydel', L.N., A.A. Petrov, and K.I. Petrov. Spectral
  Determination of Hydrogen in Metals by the Isotope
  Balance Method   206

Borgest, V.A., G.V. Veynberg, A.N. Zaydel', and A.A. Petrov.
  Isotopic Spectrum Analysis of Hydrogen-Deuteron Mixtures   207

Sventitskiy, N.S., and K.I. Taganov. Studies on the Spectral
  — Determination of Hydrogen in Metals   209

Vidro, G.I., B.D. Luft, and Tu. V. Matorin. Use of Gas-
  discharge Devices as Light Sources in the Spectrum Analysis   212
  of Inert Gases

Bochkova, O.P., and L.P. Razumovskaya. Spectrum Analysis of
  Multicomponent Gas Mixtures   214

Borovskiy, I.B., and S.A. Skotnikov. Unit for the Analysis of
  — Nitrogen in Metals and the Analysis of Gas in Small Samples 217

Filimonov, L.N., and B.N. Kagun. Spectral Analytic Determin-
  ation of Carbon and Hydrogen in Titanium   222

Card 14/31

BOCHKOVA, O.P.; RAZUMOVSKAYA, L.P.

Spectrum analysis of multicomponent gas mixtures. Fiz.sbor.
no.4:214-217 '58.   (MIRA 12:5)

1. Fizicheskiy institut Leningradskogo ordena Lenina gosudarstven-
nogo universiteta imeni A.A.Zhdanova.
                    (Gases--Spectra)

SOV/51-5-1-18/19

AUTHORS: Bochkova, O.P., Razumovskaya, L.P. and Frish, S.E.

TITLE: A Simple Method of Spectral Analysis of Purity of Inert Gases
             (Uproshchennyy metod spektral'nogo analiza inertnykh gazov na
             chistotu)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol 5, Nr 1, pp 93-94 (USSR)

ABSTRACT: The authors describe a simple photoelectric method of spectral
             analysis which is fairly accurate and it takes only 2-3 minutes
             to complete. The apparatus is shown in Fig 1. The gas to be
             analyzed is drawn in by means of a rotary pump (N) through a vessel
             for removal of excess gas (S) and a furnace with a trap (F) to a
             discharge tube in the form of a capillary (Tr) of 1 mm diameter.
             Pressure in the capillary is controlled by means of a U-type
             manometer and taps 1 and 2. Emission of the gas in the capillary
             is excited using a high-frequency generator VG-2. The emission is
             condensed by a lens (L) on to a photomultiplier and is recorded,
             without amplification, by a microammeter (μA). The nitrogen bands
             in the region 3600 $\overset{o}{A}$ are separated out by a glass light-filter F.
Card 1/3   Using known mixtures a calibrating graph is obtained, in which the

A Simple Method of Spectral Analysis of Purity of Inert Gases SOV/51-5-1-18/19

abscissa axis gives the concentration of nitrogen in percent and the ordinate axis gives the microammeter readings (α) which are proportional to the intensity of emission by the nitrogen bands. This method was used to determine the amount of nitrogen in argon of various degrees of purity. In technical-purity argon (with 9-15% N_2) the nitrogen bands are excited already at pressures of the order of 1-3 mm Hg. The calibration graph for these pressures is shown as curve 1 in Fig 2. Curve 2 in Fig 2 is the calibration graph for discharge-tube pressures of the order of 10 mm Hg. Pure argon should not contain more than 0.3% of N_2. In this case pressures of 100 mm Hg are necessary in the discharge tube in order to excite nitrogen bands. For argon of spectral purity (less than 0.01 % of N_2) discharge-tube pressures of several hundred mm Hg are necessary for a reliable analysis. Fig 3 shows the calibration curves for nitrogen in argon with 0.1-1% of N_2 (Fig 3a) and 0.01-0.1% of N_2 (Fig 3b). Instead of recording microammeter readings (α) which are proportional to the emission by the nitrogen bands one can use the ratio α/α_0, where α_0 is the total emission obtained without using the filter F. The

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A Simple Method of Spectral Analysis of Purity of Inert Gases   SOV/51-5-1-18/19

ratio α/α_0 can be measured directly using the apparatus shown in Fig 4 where M is a splitting mirror FEU-1 and FEU-2 are two photomultipliers and EPP-09 is an automatic recorder. It was found that small amounts of oxygen and carbon dioxide do not affect the analysis. The method described is used for analysis of argon in the Balashikha Oxygen Plant (Ref 4). The authors thank senior laboratory assistant N.V. Chernysheva for construction of the calibration curves. There are 4 figures and 4 Soviet references.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet,fizicheskiy institut (Leningrad State University, Physics Institute)

SUBMITTED: February 18, 1958

Card 3/3   1. Inert gases – Spectrographic analysis   2. Inert gases – Excitation
              3. Spectroscopy – Equipment

SOV/51-5-5-22/23

AUTHORS: Bochkova, O.P., Razumovskaya, L.P. and Frish, S.E.

TITLE: Spectral Analysis of Micro-Quantities of Gas (Spoktral'nyy analiz mikrokolichestv gaza)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol 5, Nr 5, pp 624-626 (USSR)

ABSTRACT: In analysing very small amounts of gas the necessary pressures in the discharge tube, used to obtain the spectrum, were produced in two ways: (a) compression in a capillary using Tepler's pump, and (b) addition of an inert gas to the analysed mixture. Both these methods were employed in analysis of small amounts of air to find the proportions of oxygen, argon and nitrogen present in them. The apparatus and technique were described in Refs 5, 6. Fig 1 gives calibration curves for determination of oxygen and argon in air. Air was initially at a pressure of 10^{-4} mm Hg occupying 250 cm^3. It was compressed into a capillary of 0.5 mm diameter and emission was excited by means of a high-frequency generator. The line pair O I at 7772 Å and N I at 7468 Å was used in determination of oxygen, while the line pair A I at 7503 Å and N I at 7468 Å was used in determination of argon. The change in the amount of argon in the mixture did not affect the relative intensity of the O--N lines and consequently it did not affect the calibration graph shown in Fig 1a. Change in the oxygen concentration altered the relative

Card 1/3

intensity of the A--N lines, leading to a parallel displacement of the calibration lines shown in Fig 1b. The mean error in determination of oxygen was 15% and in determination of argon was 8%. Employing the second method-the authors used helium as an inert gas diluent, since helium has the highest excitation potential of all gases. Addition of helium considerably increases the total mass of gas used in the analysis, and minimises the effects due to sorption and desorption of gas by the discharge-tube walls. This improves the precision of the analysis. To the original amount of air (at 10^{-4}mm Hg pressure in a volume of 250 cm^3) 3, 5, 10, 100 times that amount of helium was added. Better reproducability is obtained when the amount of helium added is five times the original amount of air. The error in determination of oxygen is then lowered to 10-12% and the error in determination of argon decreases to 5%. Addition of helium in amounts of 100 and more times the original amounts of gas to be analysed makes it possible to make a quantitative spectral analysis of amounts of the order of 0.01 mm^3 at atmospheric pressure. Fig 2 gives calibration curves for analysis of argon and oxygen in air (3 x 10^{-5}mm Hg pressure in a volume of 250 cm^3)

Card 2/3

Spectral Analysis of Micro-Quantities of Gas   SOV/51-5-5-22/23

with helium added in the proportion of 80:1.   On addition of helium a
change in the oxygen concentration does not affect the calibration curves
for argon but the error in determination of argon increases to 20%. This
is because the partial pressure of argon in such a mixture is very
small. There are 2 figures and 8 references, 4 of which are Soviet,
3 German and 1 other.

SUBMITTED: June 24, 1958

  Card 3/3   1. Gases--Quantitative analysis   2. Gases--Spectra   3. Oxygen
             --Determination   4. Nitrogen--Determination   5. Argon--Determination

24(7)

AUTHOR: Bochkova, O. P.   SOV/54-59-3-4/21

TITLE: On the Industrial Utilization of the Methods of Quantitative
                Spectrum Analysis of Noble Gases

PERIODICAL: Vestnik Leningradskogo universiteta. Seriya fiziki i khimii,
                1959, Nr 3, pp 19-24 (USSR)

ABSTRACT: In the beginning the development of quantitative spectrum
                analysis is described. In this connection S. E. Frish, V. A.
                Konovalov (Ref 1), Frish, and Shreyder (Ref 2) are mentioned;
                furthermore, the following methods are described: In 1957,
                Frish, O. P. Bochkova, L. P. Razumovskaya and N. V. Chernysheva
                developed a method of analysis with photoelectric recording of
                the radiation for the rapid determination of one or two
                impurities in large amounts of gases which is necessary in the
                industry (Refs 6, 7). Table 1 contains comparative data from
                spectrum analysis, mass spectra (data by L. L. Kotlik), and of
                the chemical analysis of Ar in He and N_2 in Ar. Table 2 contains

                the indices of the afore-mentioned method: gas mixture,
                concentration interval, excitation conditions, filter and
Card 1/3   radiation source. At the Balashikha Oxygen Plant and in the

On the Industrial Utilization of the Methods of   SOV/54-59-3-4/21
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works Autogen Nr 2 this method combined with a chemical method could be used for determining oxygen and carbon for rapid control in argon production. M. T. Borok and V. V. Aleksandrov developed a completely automatic gas analyzer by this method for determining N_2 in Ar (Fig 1). A similar gas analyzer was

devised by the master experimentalists of the NIFI of LGU. Gases of maximum purity were used as calibration materials which are produced by the factory methods of the Moskovskiy elektrolampovyy zavod (Moscow Incandescent Lamp Works), Balashikhinskiy kislorodnyy zavod (Balashikha Oxygen Plant), and the Vsesoyuznyy elektrotekhnicheskiy institut (All-Union Electrotechnical Institute). These gases must not contain more

than $10^{-3}\%$ of total impurities (O_2, H_2, N_2 and hydrocarbons).

Tables 2 and 3 contain the analysis data on the content of impurities of the gases of the works mentioned. The analyses are made with standards. Separate standard discharge tubes (Fig 2) are developed into which the standards are entered.

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> The gas mixtures in these tubes are excited by a generator
> of the frquency 100-1000 cycles. Table 4 shows the relative
> line intensities of 0.9% Ne in He and of 0.57% Ne in He
> depending upon the time of utilization of the standard.
> Herefrom no essential change of the mixture may be found
> which makes this method suited for industrial purposes.
> There are 2 figures and 4 tables.

SUBMITTED: April 15, 1959

Card 3/3

24(7), 5(2)

AUTHORS: Bochkova, O.P., Razumovskaya, L.P., Frish, S.E. and Chernysheva, N.V.

TITLE: Simple Methods of Spectral Analysis of Inert Gases for Impurities (Uproshchennyye metody spektral'nogo analiza inertnykh gazov na primesi)

ABSTRACT: The authors described earlier (Ref 3) a simple method of spectroscopic determination of the nitrogen content of argon, suitable for use under industrial conditions. The spectral instrument was replaced by a filter which separated out the required part of the spectrum. The discharge was excited in a capillary by a high-frequency oscillator and argon was drawn continuously through the capillary by means of a mechanical pump. Emission proportional to the amount of nitrogen was recorded by means of a photomultiplier FEU-19 connected to a microammeter. The sensitivity of the method was 0.01% and its precision ~10%. This simple method of analysis was applied also to determination of the amount of hydrogen in helium, neon in helium and neon-helium mixture in nitrogen. A table on p 820 gives the range of impurity concentrations which could be measured, the filters and the receivers used as well as the diameters of the capillary and pressures in it. Since only small amounts of the gases were available the discharge tubes used in the investigation reported here had capillaries closed at one end; such a capillary is denoted by

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SOV/51-6-6-25/34

Simple Methods of Spectral Analysis of Impurities in Inert Gases

3 in Fig 2 (1 and 2 are electrodes). The discharge was excited by one of the following: (1) an oscillator VG-2, (2) a low-power oscillator based on the GU-29 tube and whose working frequency was 30 Mc/s, (3) a pulse magnetron which produced 3 cm waves. The reproducibility of the results was 5-6% when (2) or (3) were used but it fell to ~10-15% when the oscillator VG-2 was employed. To construct calibration curves (microammeter current v. concentration, Fig 1) the authors used standards in the form of mixtures of known compositions. There are 2 figures, 1 table and 3 Soviet references.

Card 2/2

BOCHKOVA, O.P.

Industrial use of the methods of quantitative spectrium analysis
of inert gases. Vest.LGU 14 no.16:19-24 '59.
(MIRA 12:10)

(Gases, Rare—Spectra)

24(4),24(7)   SOV/53-69-1-10/11
AUTHORS: Bogdanova, I. P., Boohkova, O. P., Zaydel', A. N.,
                Zakharova, V. M., Kagan, Yu. M., Kaliteyevskiy, N. I., Penkin,
                N. P., Chayka, M. P.,Shukhtin, A. M., Lipis, L. V.

TITLE: Sergey Eduardovich Frish (Sergey Eduardovich Frish).
                On the Occasion of His Sixtieth Birthday
                (k shestidesyatiletiyu so dnya rozhdeniya)

PERIODICAL: Uspekhi fizicheskikh nauk, 1959, Vol 69, Nr 1, pp 165-167 (USSR)

ABSTRACT: On June 19th, 1959, the well-known Soviet physicist S. E. Frish,
                who made a name for himself especially in the field of
                spectroscopic optics, attained the age of sixty. He began his
                scientific work as a student at the fiziko-matematicheskoye
                otdeleniye Leningradskogo universiteta (Physico-mathematical
                Department of Leningrad University) under D. S. Rozhdestvenskiy.
                After completing his university studies he continued his work
                at the Gosudarstvennyy Opticheskiy institut (Optical State
                Institute). Since 1934 he held a chair for optics and supervised
                work at the Physics Department, first as dean and later as
                director of the Nauchno-issledovatel'skiy fizicheskiy institut
Card 1/3   LGU (Scientific Research Institute for Physics at Leningrad

State University). In 1946 he was appointed Corresponding
Member, AS USSR, and took active part in the work of the
Academy. He is deputy chairman of the spectroscopy Committee,
chief editor of the periodical "Optika i spektroskopiya" and
member of the International Committee for spectroscopy at the
UNESCO. He first concentrated his scientific interest on
atomic energy, the systematics of atomic spectra, the Zeeman
effect in the sodium and potassium spectrum, as well as upon
experimental spectroanalytical investigations. In 1930 he
started a cycle of works, which was devoted to optical methods
of investigating the properties of the atomic nucleus. (An
investigation of the interaction between nucleus and electron
shell led to the discovery of the hyperfine structure of
spe-tra). He investigated the hyperfine structure of Na and set
up a rule concerning the interrelation between nucleus-spin-
and parity. He further investigated the fine structure of
isotope mixtures, the excitation mechanism of the higher atomic
levels, and questions of the interaction of elementary

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Sergey Eduardovich Frish.   SOV/53-69-1-10/11
On the Occasion of His Sixtieth Birthday

        particles. Finally, mention is made of his pedagogical
        activities, especially his courses in physics (which are
        partly held together with A. V. Timoreva). There are
        1 figure and 42 Soviet references.

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S/051/60/009/002/005/006
E201/E691

AUTHORS: Razumovskaya, L.P. and Bochkova, O.P.

TITLE: Optical and Electrical Properties of "Strong" and "Weak"
              High-Frequency Discharges in Neon

PERIODICAL: Optika i spektroskopiya, 1960, Vol. 9, No. 2, pp. 271-273

TEXT: The authors report a study of two stable forms ("strong" and "weak")
of a 6 Mc/s discharge in neon.   Neon was placed in a cylindrical tube
(12 mm diameter and 150 mm length) with external ring-shaped electrodes 70 mm
apart.   The two forms of the discharge were possible only at pressures
of p = 0.2-0.3 mm Hg.   Fig. 1 (curves 1) shows that the electron temperature
T_e was independent of the voltage applied to the discharge tube, but was
different for the two forms of the discharge: 67 000°K in the "strong" case
and 81 000°K in the "weak" case.   In both cases the electron density
(Fig. 1, curves 2) was of the order of 10^9-10^{10} cm^{-3} and rose linearly with
the tube voltage.   The electron density, however, was higher in "strong"
discharges.   Although the total luminance of the "strong" discharge was
considerably greater than that of the "weak" one, in both cases only arc

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Optical and Electrical Properties of "Strong" and "Weak" High-Frequency
Discharges in Neon

lines were excited in the positive column. The measured relative
intensities of the 4712, 4704, 4708, 5330, 5341, and 5400 $\AA$ lines
(the 4712 $\AA$ line intensity was taken to be unity) are listed in Table 1;
they were obtained at a tube voltage of 1100 V and p = 0.2 mm Hg. Fig. 2
gives the dependence of the relative spectral line intensities on the tube
voltage, with and without allowance for reabsorption. Reabsorption of
lines ending at the $3P^0_{0, 1, 2}$ levels was considerably greater in "strong"
discharges than in "weak" ones. Concentrations of the excited atoms at the
$3P^0_{0, 1, 2}$ and $1P^0_0$ levels, deduced from measurements of reabsorption, are listed
in Table 2 for p = 0.2 mm Hg and a tube voltage of 1000 V; these concentrations
were 3-4 times greater in "strong" discharges than in "weak" ones. It was
concluded that the optical differences between "strong" and "weak" discharges
were related primarily to the differences in the electron densities. The

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S/051/60/009/002/005/006
E201/E691

Optical and Electrical Properties of "Strong" and "Weak" High-Frequency
Discharges in Neon

authors suggested that in high-frequency spectrochemical analysis "weak"
discharges may be used to increase the concentration sensitivity.
Acknowledgments are made to S.E. Frish and Yu.M. Kagan for their help and
advice.   There are 2 figures, 2 tables and 5 references: 4 Soviet and
1 English.

SUBMITTED: March 25, 1960

Card 3/3

USTINOV, V.B., BOCHKOVA, O.P., RAZUMOVSKAYA, L.P.

Low-power high frequency generator for use in the spectrum
analysis of gases. Zav.lab. 26 no.5:621-622 '60.
(MIRA 13:7)

1. Leningradskiy gosudarstvennyy universitet im. A.A.
Zhdanova.
(Gases--Spectra)

3/058/61/000/008/018/044
A058/A101

5.5310

AUTHORS: Boohkova, O. P., Chernysheva, N. V.

TITLE: Spectral analysis of helium for content of minor admixtures of nitrogen and hydrogen

PERIODICAL: Referativnyy zhurnal, Fizika, no. 8, 1961, 170, abstract 8J132
("Gaz. prom-st'", no. 1, 1961, 49-53)

TEXT: There was developed a method for analysis of He - H_2 - N_2 mixtures that enables one to determine 0.01 - 0.001% admixture of N_2 and H_2. There is given a diagram of the laboratory set-up, consisting of a glass vacuum system containing a d = 1-1.5 mm capillary in which a h-f discharge is excited from a ВГ -2 (VG-2) oscillator; a monochromator and a radiation counter [either ФЭУ -17 (FEU-17) or ФЭУ-19 (FEU-19) with indicating microammeter]. The H_2 and N_2 in the He were determined by the three standards method. The limit sensitivity of of the analysis, the relative error (10-25%) and the influence of H_2 and N_2 on the analysis of He - N_2 and He - N_2 mixtures ...(')

[Abstracter's note: Complete translation]

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26763
S/054/61/000/003/001/003
B102/B203

$24,3100(1051,1106)$

AUTHORS: Frish, S. E., Bochkova, O. P.

TITLE: Methods of determining transition probabilities and
             level populations by self-absorption of radiation

PERIODICAL: Leningradskiy Universitet. Vestnik. Seriya fiziki
             i khimii, no. 3, 1961, 40 - 58

TEXT: The authors thoroughly discuss some methods of determining the
transition probabilities A_{ki} and the populations N_i and N_k of the levels
i and k (where k is the upper level). All methods are based on a simple
relationship between the absorption coefficient of light within the light
source, integrated over the whole line width (self-absorption), and the

product $A_{ki}N_i$. Assuming $\dfrac{g_i}{g_k} \cdot \dfrac{N_k}{N_i} \ll 1$ (which is justified), this

relationship can be formulated as follows: $\int_0^{\gamma} \varkappa(\nu)\, d\nu = \dfrac{g_k}{g_i} \cdot \dfrac{\lambda^2_{ki}}{8\pi}\, A_{ki}N_i.$

If, instead of A_{ki}, the oscillator force f_{ik} is used, one obtains in the
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Methods of determining transition ...

same approximation: $\int_0^\infty \varkappa(\nu)\, d\nu = \frac{\pi l^2}{mc} f_{ik} N_i$; g_k and g_i are the statistical

weights. The integral $\int_0^\infty \varkappa(\nu)\, d\nu$ can be determined by self-absorption

measurements. A number of methods known for a long time are available
for these measurements; they are mainly based on the use of one or two
plane or concave mirrors. The authors describe in detail the method
using two plane mirrors and a discharge tube of length l as a light
source. A condition for the applicability of these methods is that the
light-emitting volume be homogeneous, and that the spectral lines have a

Doppler form. Then, $\varkappa(\nu) = \varkappa(0)\, e^{-\omega^2}$, $\omega = c\sqrt{\beta}\, \frac{\nu - \nu_0}{\nu_0}$, $\beta = \mu/2RT$, (μ - atomic

weight), and the width of the Doppler line is given by $\Delta\nu_D = \frac{2\nu_0}{c}\sqrt{(\ln 2)/\beta}$;

$\varkappa(0)$ and ν_0 are the absorption coefficient and the frequency in the

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middle of the line. For such a line, $\int_{-\infty}^{+\infty} \varkappa(\nu)\,d\nu = \frac{1}{2}\sqrt{\frac{\pi}{\ln 2}}\,\varkappa(0)\,\Delta\nu_D$.
Numerical computations are also possible for any other line forms. The
most important functions appearing in computations, such as
$F(\varkappa(0), 1, r_1, r_2) = F_1 + r_2 F_2$ are tabulated here; F indicates the
ratio of light intensities with and without mirror; r_1 and r_2 are the
reflection coefficients of the two mirrors. Similar formulas can even
be used if the lines have a fine structure. As examples, the authors
consider the sodium line $3^2S_{1/2} - 3^2P_{3/2}$, $\lambda 5890\overset{\circ}{A}$ (where the lower level
shows a splitting with $\Delta\Lambda = 0.021\overset{\circ}{A}$) and the red neon lines ($2p^5 3p \to 2p^5 3s$)
which also show a hyperfine structure due to the existence of isotopes.
The results obtained are in good agreement with those obtained by other
authors. The investigations show that the self-absorption methods are
well suited for determining transition probabilities and population
numbers, and deliver results with an error of about $\pm 15\%$. The authors
mention V. I. Perel' (who supervised part of the computations), as well

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Methods of determining transition ...

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as I. D. Podmoshinskiy, L. D. Kondrasheva, and I. P. Bogdanova. There
are 13 figures, 6 tables, and 13 references: 6 Soviet and 7 non-Soviet.
The three references to English-language publications read as follows:
J. A. Harrison. Proc. Roy. Soc., 73, 841, 1959; J. U. White. JOSA, 32,
285, 1942; R. Ladenburg. Rev. Mod. Phys., 5, 243, 1933.

Card 4/4

BOCHKOVA, O.P.; CHERNYSHEVA, N.V.

Spectral analysis of helium for the content of nitrogen and
hydrogen traces. Gas. prom. 6:49-53 '61.   (MIRA 14:1)
(Helium—Spectra)   (Hydrogen—Spectra)   (Nitrogen—Spectra)

S/051/61/011/006/001/012
E059/E385

AUTHORS: Bochkova, O.P., Razumovskaya, L.P. and Frish, S.E.

TITLE: Spectroscopic investigations of high-frequency
             discharges in neon

PERIODICAL: Optika i spektroskopiya, v.11, no.6, 1961, 697-705

TEXT: High-frequency discharges in gases are widely used as
light sources for various optical investigations and for spectral
analysis. This paper describes a detailed investigation of this
type of discharge. Radiation re-absorption and double-probe
methods were used to determine the optical and electrical charac-
teristics of an electrodeless high-frequency discharge in neon.
The discharges were produced in tubes of 3.5, 12, 40 and 60 mm
in diameter and 130 - 300 mm in length. The high-frequency
voltage was supplied to external electrodes from a 6 Mc/s, 350 W
generator. The tubes were evacuated by a fully trapped high-
vacuum system. Natural neon, containing not more than 0.3% helium,
was used. Other impurities (O_2, H_2, N_2) did not exceed

10^{-3}%. The spectroscopic observations were made in the visible
(red) part of the spectrum and data produced on the population
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S/051/61/011/006/001/012

Spectroscopic investigations E059/E335

levels $2p^5 3sX$ and $2p^5 3pY$ in neon. The probes used consisted of molybdenum wire 0.2 mm diameter and 5 mm long sealed into the glass. Electron temperatures T_e were found from the probe characteristics by the method of E.O. Johnson, L. Molter (Ref. 12: Phys. Rev., 80, 58, 1950) and the electron density n_e from the formula of Yu.M. Kagan and V.I. Perel' (Ref. 13: DAN SSSR, 91, 1321, 1953). The dependence of electron temperature and density on tube diameter, gas pressure and HF power was determined. The highest values of n_e and T_e were obtained in the 3.5 mm diameter tube in which $n_e = 12 \times 10^{-11}$ and $T_e = 100 \times 10^{-3}$ at a pressure of 1.3 mm Hg and fell rapidly as the tube diameter was increased to values of $n_c = 2 \times 10^{-11}$ and $T_e = 20 \times 10^{-3}$ for the 60-mm diameter tube. The highest values of T_e were obtained at low pressures ranging from

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Spectroscopic investigations ....

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E039/E385

T_e = 100 x 10^{-3} at 1.5 mm to 45 x 10^{-3} at 6 mm; the electron density n_e, however, is effectively directly proportional to pressure. It is shown that T_e is practically independent of the high-frequency power input while n_e is directly proportional to it. Comparison is made with DC discharges and it is shown that higher values of T_e are obtained in the HF discharge. It is shown that the conditions in a HF discharge are easily varied over a wide range by changing-pressure, power input and diameter of tube, hence making it a very suitable source for all spectral analysis problems. A.A. Zaytsev and Ye.N. Yankovskaya are mentioned in the article for their contributions in this field. There are 9 figures and 20 references: 12 Soviet-bloc and 8 non-Soviet-bloc. The four latest English-language references mentioned are: Ref. 2: A.T. Forrester, K.A. Gundmundsen, P.O. Johnson - J. Opt. Soc. Amer. 46, 539. 1956; Ref. 6: J.A. Harrison - Proc. Phys. Soc., 73, 841, 1959; Ref. 12: mentioned in text; Ref. 19: A.V. Phelps, Phys. Rev., 99, 1657, 1955.
SUBMITTED: March 16, 1961
Card 3/3

FRISH, S.E.; BOCHKOVA, O.P.

.Self-absorption methods for determining the probabilities of
transitions and the populations of levels. Vest LGU 16
no.16:40-58 '61.   (MIRA 14:8)
                  (Nuclei, Atomic)

FRISH, S.E.; BOCHKOVA, O.P.

Additions and corrections to the article "Methods for determining the probability of transitions and the population of levels from the self-absorption of radiation." Vest. LGU 17 no.4:73-74 '62.

(MIRA 15:3)

(Quantum theory)

L 1683-66   EWT(1)/EPA(s)-2/EPA(w)-2/EWA(m)-2

ACCESSION NR: AT5010025   GE/0000/62/000/000/0379/0387

AUTHOR: Bochkova, O. P.; Razumovskaya, L. P.; Frish, S. E.

TITLE: Spectrographic analysis of a high frequency discharge in neon

SOURCE: Physikalische Gesellschaft in der Deutschen Demokratischen Republik.
Tagung, Jena, 1960. Optik und Spektroskopie aller Wellenlangen (Optics and spectro-
scopy of all wave lengths); Tagung der Physikalischen Gesellschaft in der DDR.
Berlin, A-V, 1962, 379-387

TOPIC TAGS: neon, gas discharge spectroscopy, line spectrum, line intensity,
electron energy level

ABSTRACT: The optic and electrical characteristics of an electrodeless high fre-
quency discharge in neon are studied using radiation reabsorption and the two-probe
method. Two molybdenum glass discharge tubes were used--one 12 mm in diameter and
150 mm long, the other 60 mm in diameter and 300 mm long. High frequency voltage
was fed from a 6 Mc HF generator with a power of ∿350 watts to the external elec-
trodes of the discharge tube. Two molybdenum probes were sealed into the 12 mm
tube at the center along the axis. These probes were 0.2 mm in diameter and 5 mm
long. The distance between the probes was 15 mm. Data were also obtained on the

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ACCESSION NR: AT5010025 O

population of the lower $2p^53s\,^3P_{0\,1\,2}$, $^1P_1$ and $2p^53p\Upsilon$ levels in neon as a function of pressure (in the 0.5-7 mm Hg range) and as a function of electron concentration. Reabsorption measurements were made across the emitting column in the 12 mm tube and along the column in the 60 mm tube. It was found that the maximum population for $2p^53s\,^3P_{0\,1\,2}$ levels lies at a pressure of approximately 1.3 mm Hg, while the maximum for $2p^53p\Upsilon$ levels is situated at a higher pressure (2-3 mm Hg). When the concentration of electrons is varied within small limits, an increase is observed in the concentration of excited atoms on all levels. A further increase in the concentration of electrons leads to an extremely flat maximum in the concentration of excited atoms. The relative line intensity varies considerably with pressure. When the pressure is increased, there is a sharp reduction in the intensity of lines where $2p^53p\,^1S_0$ is the upper level. When the lines have upper levels which are lower than this, the intensity maxima lie at pressures in the 1.5-4 mm Hg range. Lines whose upper levels correspond to the $2p^54d$ and higher configurations have very low intensities. Orig. art. has: 4 figures.

ASSOCIATION: none

SUBMITTED: 00   ENCL: 00   SUB CODE: ME, OP

NO REF SOV: 009   OTHER: 006

Card 2/2 $\mathcal{OP}$

FRISH, S.E.; BOCHKOVA, O.P.

Present state of the quantitative emission analysis of gaseous
mixtures: (survey). Zav.lab. 28 no.5:550-552 '62. (MIRA 15:6)
(Gases—Spectra)

BOCHKOVA, Ol'ga Pavlovna; SHREYDER, Yelena Yakovlevna; FRISH, S.E.,
        prof., red.; ORLCVA, L.I., red.; LUK'YANOV, A.A., tekhn.red.

[Spectrum analysis of gaseous mixtures] Spektral'nyi analiz
gazovykh smesei. Izd.2., perer. i dop. Moskva, Gos.izd-vo
fiziko-matem. lit-ry, 1963. 307 p. (Biblioteka inzhenera;
fizika i tekhnika spektral'nogo analiza)   (MIRA 16:12)

1. Chlen-korrespondent AN SSSR (for Frish).
                    (Gases--Spectra)

BOCHKOVA, O.P.; RAZUMOVSKAYA, L.P.

Spectroscopic observation of an unstable region in the transition
from a "weak" to a "strong" high-frequency discharge. Opt. i
spektr. 15 no.5:716-718 N '63.   (MIRA 16:12)

L 18144-63   EPF(n)-2/EWP(q)/EWT(m)/BDS   AFFTC/ASD/SSD   Pu-4   WW/JD/JG
ACCESSION NR: AP3004502   S/0048/63/027/008/1065/1069   66

AUTHOR: Frish,S.E.; Bochkova, O.P.

TITLE: Evaluation of the absolute cross sections for second order impact in a mixture of sodium and mercury vapors /Report presented at the Second All-Union Conference on the Physics of Electronic and Atomic Collisions held in Uzhgorod 2-9 Oct 1962/

SOURCE: AN SSSR, Izvestiya,ser.fiz., v.27, no.8, 1963, 1065-1069

TOPIC TAGS: second order collision , second order impact, optical pumping, excitation cross section , Na, Hg

ABSTRACT: Back in 1936, S.E.Frish in collaboration with A.A.Ferkhmin (S.E.Frish, Izv.AN SSSR,Ser.fiz.,No.3, 431, 1936 and Ferchmen and S.Frisch, Z.Sow.Union,9,446, 1936) observed a substantial increase in the intensity of some secondary series lines of Na vapor under electron impact in the presence of Hg vapor. Obviously, the effect can be utilized for determining cross sections for second order (atom-atom) impact. The case of excitation of Na atoms as a result of first order impact with electrons and second order impact with Hg atoms is considered and the equation for the steady-state is written. From this the authors derive an expression for

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ACCESSION NR: AP3004502

the cross section for second order impact; this expression was used to calculate
the cross section for second order collisions between Na atoms and excited Hg atoms
on the basis of the concentrations of Na and Hg atoms in different states and the
probabilities for spontaneous transitions between the respective states. The mea-
surements were carried out for pure Na and a mixture of Hg + Na vapor excited by a
high-frequency (6 to 50 Mc) discharges in cylindrical molybdenum glass (with sap-
phire windows) tubes 18 to 25 cm in diameter and 60-80 cm in length with external
electrodes; separate tubes with one and two side branches, respectively, were used
for the measurements on pure Na and the Na + Hg vapor mixture. Analysis indicates
that the most intense excitation due to second order impacts may be expected for
the 6P, 7S, and 6D levels of Na in collisions with Hg atoms in the 6^3P_0 state and
the 8S, 7D, 7F, 8P, 9S, 8D, and 9P levels of Na in collisions with Hg atoms in the
6^3P_1 state. The increase in line intensity in going from pure Na to Na + Hg de-
pends strongly on the discharge conditions (current density and vapor pressure)
which must, therefore, be carefully controlled (this presents some experimental
difficulties). As a result of the measurements there were obtained the excitation
cross sections for some of the S and P levels of Na (the cross sections for excita-
tion of the D levels could not be determined for lack of knowledge of the popula-
tion of the F levels from which there occur intense transitions to the D levels).

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ACCESSION NR: AP3004502   0

The data show that large cross sections for second order impact excitation obtain only when the energy difference between the levels involved does not exceed a few hundred eV. This suggests the possibility of realizing selective population of individual atomic levels and of obtaining "negative" absorption coefficients. Orig, art. has: 7 formulas, 2 figures and 2 tables.

ASSOCIATION: none

SUBMITTED: 00   DATE ACQ: 26Aug63   ENCL: 00

SUB CODE: PH   NO REF SOV: 005   OTHER: 000

Card 3/3

FRISH, S. E.; BOCHKOVA, O. P.

"On the Role of the Second Kind Collisions during the Excitation of Metal Vapour Mixtures in the High-Frequency Discharge."

report submitted to 11th Intl Spectroscopy Colloq, Belgrade, 30 Sep-4 Oct 63.

ACCESSION NR: AP4042977   8/0051/64/017/001/0016/0023

AUTHORS: Bochkova, O. P.; Razumovskaya, L. P.

TITLE: Spectroscopic investigation of 'weak' and 'strong' high fre-
quency discharges in noble gases

SOURCE: Optika i spektroskopiya, v. 17, no. 1, 1964, 16-23

TOPIC TAGS: high frequency discharge, inert gas, helium, neon,
argon, electron temperature, excited state, electron concentration

ABSTRACT: Following earlier studies of the jumplike discontinuity
existing in a high-frequency low-pressure discharge in noble gases,
between the so-called "weak" and "strong" discharges (Opt. i spektr.
v. 9, 271, 1960 and v. 15, 716, 1964), the authors investigated the
glow produced by both types of discharge near the discontinuity re-
gion. They measured the electron temperatures and the excited-atom
concentrations as functions of the initial pressure, the discharge-

Cord 1/7

ACCESSION NR: AP4042977

tube diameter, and the electron concentration in the discharge. The
test setup is described. The excited atom concentrations were calcu-
lated for a large number of levels of helium, neon, and argon from
the experimentally measured electron temperatures and concentrations
and the results compared with the experimental data. For the higher
levels, the experimental data differ from the calculated values by
one or two orders of magnitude, although in some cases the discrep-
ancy is not as large. The discrepancy can be eliminated by assuming
that the upper levels disintegrate as a result of collisions with
normal atoms. The results are used to propose a mechanism for the
population and disintegration of the excited states of these gases
in the discontinuity region. This mechanism is connected in the case
of helium with population of the upper levels as a result of the de-
cay of ionic-molecular compounds. "The authors are deeply grateful
to S. E. Frish for numerous discussions of the results." Orig. art.
has: 2 figures, 8 formulas, and 5 tables.

Card 2/ 2

ACCESSION NR: AP4042977

ASSOCIATION: None

SUBMITTED: 17Jul63   :   ENCL: 04

SUB CODE: NP, OP   NR REF SOV: 018   OTHER: 011

Card 3/7

ACCESSION NR: AP4042977

Dependence of electron temperature on the electron density in 'strong' (A) and 'weak' discharges in helium (1), neon (2), and argon (3)

Card   4/7

ACCESSION NR: AP4042977

ENCLOSURE: 02
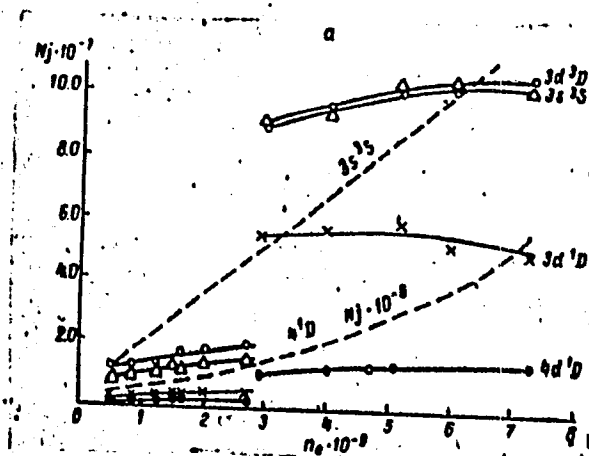
(continued in enclosure #3)

Card 5/7
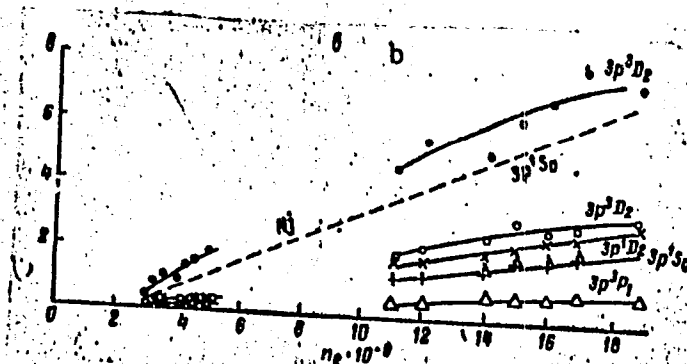
(continuation of enclosure #2)

Card 6/7

ACCESSION NR: AP4042977
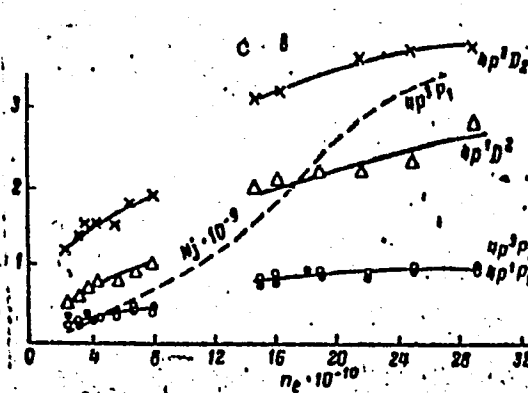
Legend for Encl. 02 and 03 and 04 :

Concentration of excited atoms on the high-energy levels in helium (a), neon (b), and argon (c) vs. the concentration of the electrons in 'weak' and 'strong' discharges

The dashed lines show the calculated curve for one of the levels of Ne, He, and Ar. At low electron concentrations, left -- 'weak' discharge; at high concentration, right -- 'strong' discharge

Card 7/7

ACCESSION NR: AP4035808   S/0020/64/156/001/0054/0056

AUTHORS: Bogdanova, I.P.; Bochkova, O.P.; Frish, S.E. (Corresponding
    member)

TITLE: The role of molecular ion formation on atomic line excitation
    spectra

SOURCE: AN SSSR. Doklady*, v. 156, no. 1, 1964, 54-56

TOPIC TAGS: atomic excitation spectra, molecular ion, molecular ion
formation, helium sup+ sub 2, helium spectrum, excited helium, con-
tinuously activating field, pulsating field, free electron, plasma
state

ABSTRACT: The additional maximum observed by I.P. Bogdanova and I.
Geytsi (Optika i spektroskopiya, 17, No. 1 (1964)) near the threshold
in the optical functions of certain lines of excited helium when
hydrogen, krypton or mercury vapor (but not when neon) was added to
the helium, was investigated further. The optical function for He
($\lambda 4713 \text{Å}$) was measured in a continuously activating field, and under
a pulsating field (10^{-7} sec. activation separated by intervals of 2×10^{-5} sec.). The maximum appeared under continuous excitation, but

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ACCESSION NR: AP4035808

not for pulsed excitation. This maximum is explained by the reaction (where * indicates active state):

$$He + e \rightarrow He* + e \quad (a)$$
$$He* + He \rightarrow He_2^+ + e \quad (b)$$
$$He_2^+ + e \rightarrow He*_2 + He \quad (c)$$
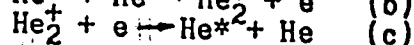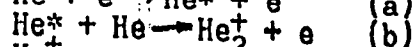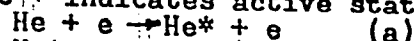
The role of the added gas is to supply "slow" electrons for the step (c). The authors state that the disassociative recombination of step (c) leads to selective activation of the molecules (especially in the S and D levels). This process would explain the energy level of the additional maximum and the time dependency of activation. Reference was made to the work of O.P. Bochkova, L.P. Razumovskaya (Optika i spektroskopiya, 17, No. 1(1964)) where formation of molecular ions was postulated to explain a jump increase in free electrons in the plasma state. At the same time the intensities of the low energy level lines in the spectrum increased by a greater amount than the high energy levels, and this variation in population of the levels was greater than that which would correspond to the conditions of

Card 2/3

ACCESSION NR: AP4035808

temperature and electron concentration. This is explained by molecular ion formation according to (b). The effective cross section of steps (b) and (c) were calculated: about 2×10^{-5} cm^2 and about 10^{-13}cm^2 respectively. Orig. art. has: 8 equations and 1 figure

ASSOCIATION: Leningradskiy gosudarstvenny*y universitet im. A. A. Zhdanova (Leningrad State University)

SUBMITTED: 28Jan64   ENCL: 00

SUB CODE: N.P   NR REF SOV: 006   OTHER: 002

Gard   3/3

BOCHKOVA, O.P.; CHERNYSHEVA, N.V.

Spectral method for determining small impurities in helium. Gaz.
prom. 9 no.2:46-50 '64.

(MIRA 17:12)

L 64510-65   EPF(c)/EPA(s)-2/EPA(s)-2/EWT(1)/EWT(m)/EWP(b)/EWA(m)-2/EWP(t)   IJP(c)   JD

ACCESSION NR: AP5012503   UR/0051/65/018/005/0777/0784
                                            537.523.527:548.294

AUTHORS: Bochkova, O. P.; Razumovskaya, L. P.

TITLE: Spectroscopic investigation of a high-frequency discharge in helium

SOURCE: Optika i spektroskopiya, v. 18, no. 5, 1965, 777-784

TOPIC TAGS: gas discharge, high frequency discharge, helium, excited state, pressure effect

ABSTRACT: This is a continuation of earlier investigations of high-frequency discharges in neon and argon (Opt. 1 spektr. v. 11, 697, 1961 and v. 14, 189, 1963). The present investigation is devoted to discharge in helium as a function of the excitation conditions (gas pressure, diameter of discharge tube, and high-frequency voltage on the electrodes). The measurements were carried out in cylindrical molybdenum-glass discharge tubes of 3 -- 60 mm in diameter and 120 -- 750 mm long. A VG-2 generator operating at a constant frequency of

Card 1/3

L 61510-65

ACCESSION NR: AP5012603

6 Mcs and a constant rating 150 watts was used for the excitation. The pressure interval from 0.1 to 7 mm Hg was studied. The concentration of the excited atoms was determined by reabsorption and radiation methods. The concentration measurements were accompanied by measurements of the electron temperature and the electron density. The results show that the plots of the excited-helium-atom concentration vs. pressure show the same maximum as in the case of neon and argon. The variation of the concentration of the exciting atoms has a characteristic nonmonotonic variation with the density, and relatively large populations of the n^3P, small concentrations of the n^1P levels, and some population inversions are observed. The relative roles of the elementary processes in the population and in the deterioration of the excited states of helium are estimated on the basis of the results, within the framework of the existing notions concerning the gas-discharge radiation mechanism. The numbers of direct and stepwise acts of population of the upper levels per unit time and per unit volume, as well as the numbers of the quanta emitted from these levels and the calculated and experimental values of the

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L 64510-65

ACCESSION NR: AP5012603

3

concentrations of the excited atoms, are tabulated for all the energy levels. 'The authors are deeply to S. E. Frish for a discussion of the results.' Orig. art. has: 4 figures, 2 formulas, and 3 tables.

ASSOCIATION: None

SUBMITTED: 22Apr64   ENCL: 00   SUB CODE: OP

NR REF SOV: 014   OTHER: 007

Card 3/3

EWT(1)/EWT(m)/EWP(t)/ETI   IJP(c)   JD/WW/JG

CC NR: AF6015434   SOURCE CODE: UR/0051/66/020/005/0   /0903

AUTHOR: Bochkova, O. P.

ORG: none

TITLE: Luminescence of a mixture of zinc and mercury vapors in a high frequency discharge

SOURCE: Optika i spektroskopiya, v. 20, no. 5, 1966, 9 -903

TOPIC TAGS: zinc, mercury, luminescence spectrum, electron energy level, high frequency discharge, excitation cross section, gas discharge spectroscopy

ABSTRACT: The experiment was undertaken in order to clarify the role of collisions of the second kind in the population of the $4\,^1D_2$ and $5\,^3S_1$ levels of zinc and to evaluate the effective excitation cross section. The populations of a series of singlet and triplet levels of zinc and mercury in pure zinc and in a mixture of zinc and mercury vapors were measured. The discharge was excited with a high-frequency 300 W oscillator with $f \sim 6$ Mc. In the excitation of the zinc-mercury vapor mixture, no inversion was observed in the population of the $4\,^1D_2 - 4\,^1P_1$ levels, although a certain increase in the transparency of the discharge for the 6362 A line was noted. The difference in the concentrations ($4\,^1D_2 < 4\,^1P_1$) was two orders of magnitude. The observed increase in the population of the $4\,^1D_2$ level of zinc upon addition of

Card   1/2   UDC: 537.523/.527

L 34396-66

ACC NR: AP6015434

mercury should not be attributed to the presence of collisions of the second kind. The process of selective population of the $4\ ^1D_2$ and $5\ ^1D_2$ levels of zinc upon addition of mercury and hydrogen is more likely related to the formation and breakdown of molecular and ionic-molecular species such as ZnH, ZnHg, ZnH^+, Zn_2, and Zn_2^+. Orig. art. has: 3 figures and 1 table.

SUB CODE: 20/ SUBM DATE: 05Apr65/ ORIG REF: 004/ OTH REF: 002

2/2

BOCHKOVA, R.P.

Increasing the productivity of the manufacture of coil-type windings.
Priborostroenie no.1:21-23 Ja '65.   (MIRA 18:3)

Bochkova, T.G.

BOCHKOVA, Y.

The financing system in the service of economic and cultural development in People's Hungary. Fin.SSSR 16 no.3:35-41 Mr'55.
(MIRA 8:2)
(Hungary--Economic conditions)

BUTAKOV, D.; BOCHKOVA, V.; SHEVEL', I.; CHIZHOV, K.Ya., otv.red.; ROSHCHIHA, L., red.; TELEGINA, T., tekhn.red.

[Finances of the people's democracies] Finansy stran narodnoi demokratii. Moskva, Gosfinizdat, 1959. 343 p.   (MIRA 13:3)

1. Nauchno-issledovatel'skiy finansovyy institut (for Butakov, Bochkova, Shevel').
                    (Finance)

BOCHKOVA, V.; BUTAKOV, D.; BURLAKOV, M.; SHEVEL', I.; CHIZHOV, K.Ya.;
    ZABOROV, Ya., red. izd-va; POGODIN, Yu., red. izd-va; TELEGINA, T.,
    tekhn. red.

[Banks and credit in the people's democracies] Banki i kredit v stra-
nakh narodnoi demokratii. By V.I.Boch'.ova i dr. Moskva, Gosfinizdat,
1961. 323 p.   (MIRA 14:11)
    (Communist countries—Banks and banking)
        (Communist countries—Credit)

BOCHKOVA, V.A.

Effect of biomycin on immunogenesis in the case of dead whooping cough microbes. Trudy IEMG no.8:146-153 '61
                                                        (MIRA 17:2)

KRUSHINSKAYA, Ye.A.; BOCHKOVA, V.A.; BIRGER, M.O.

Medium from dried nutrient agar for determining the toxigenicity
of diphtheria microbes. Lab. delo 10 no.3:172-175   '64.(MIRA 17:5)

1. Moskovskiy nauchno-issledovatel'skiy institut epidemiologii i
mikrobiologii.

BOCHKOVA, V. A., CAND MED SCI, "EXPERIMENTAL STUDY OF THE EFFECT OF ANTIBIOTICS ON IMMUNOLOGICAL REACTIVITY OF the MACROORGANISMS. (PENICILLIN, SYNTHOMYCIN, BIOMYCIN)." MOSCOW, 1961. (FIRST MOSCOW ORDER OF LENIN MED INST IM I. M. SECHENOV). (KL, 3-61, 230).

395

BOCHKOVA, V.A.

In the governing Presidium of the All-Russian Medical Society of
Epidemiologists, Microbiologists, and Infectious Disease
Specialists. Zhur.mikrobiol., epid.i immun. 33 no.8:156-157 Ag
'62.
(MIRA 15:10)
(MICROBIOLOGICAL SOCIETIES)

KRAVCHENKO, N.A.; SADYKOVA, V.B.; AL'TGAUZEN, V.P.; BEREZKINA, G.N.;
    KOSTYUKOVA, N.N.; SUSLOVA, V.S.; BOCHKOVA, V.A.; NEYMARK, F.M.

"Indicator" method for the detection and identification of
diphtheria pathogen cultures, suggested by G.V. Andreeva and
Z.N. Poliakova. Zhur. mikrobiol., epid. i immun. 40 no.3:
131-132 Mr '63.   (MIRA 17:2)

EINGORN, A.L.; YEFIMOVA, A.A.; BARYKINA, Z.V.; BOCHKOVA, V.A.; MIKHEYEVA, G.A.

Active immunization of children in an early period of primary
tuberculous infection with the polyvalent pertussis-diphtheria-
tetanus vaccine. Zhur.mikrobiol., epid. i immun. 42 no.9:24-31
S '65.   (MIRA 18:12)

1. Moskovskiy institut epidemiologii i mikrobiologii i Institut
pediatrii AMN SSSR.

to NaOEt (0.2g, N) and mixed with mixing and cooling

BOCHKOVA, V.N., Cand Chem Sci—(diss) "Study of the stability of com-

plex compounds of nickel, cobalt, and copper with certain oximes of alpha-

diketones." Mos, 1958. 11 pp (Mos State U im M.V.Lomonosov. Chemical

Faculty. Chair of Analytical Chemistry), 130 copies (KL,45-58, 142)

— 20 —

AUTHORS: Peshkova, V. M., Bochkova, V. M.   SOV 156-58-1-16/46

TITLE: The Compounds of Copper, Nickel, and Cobalt With Several
              Dioximes (Soyedineniya medi, nikelya i kobal'ta s nekotorymi
              dioksimami)

PERIODICAL: Nauchnyye doklady vysshey shkoly, Khimiya i khimicheskaya
              tekhnologiya, 1958, Nr 1, pp. 62 - 67 (USSR)

ABSTRACT: The dioximes were the first organic reagents investigated
              already in 1906 (Ref 1) which were used in the chemical ana-
              lysis. The α-dioximes form, according to the structure of
              the molecule, compounds with nickel and palladium at different
              pH-values of the solution (Ref 2) between 3,3 and 8,5. This
              is connected with the different stability of the nickel
              compounds. This is to be proved in the present paper, i.e. by the
              determination of quantities which characterize the said
              stability. Furthermore it was the authors' object to determine
              the comparative stability of the complex compounds of Co, Ni,
              and Cu. The stability of the complexes of several aromatic
              α-dioximes: α-benzyl-dioxime (I), phenyl-dioxime (II), anisyl-
              dioxime(III), α-furyl-dioxime (IV), and cyclohexandion-dioxime
Card 1/3   (V) with the three mentioned metals were discussed. Table 1

The Compounds of Copper, Nickel, and Cobalt With Several SOV 156-58-1-16/46
Dioximes

gives the dissociation constants of the dioximes in dioxanes
of 50%. The determined stability constants are shown in table
2. The basic equation for the calculation of the constants
was supplied by Bjerrum (B'yerrum, Ref 3):

$$\sum_{0}^{N} (n - \bar{n})K \, /A/^n = 0 \quad (1).$$ n denotes the average number of the

molecules of the addendum falling to one metal atom; /A/ denotes
the concentration of the free addendum; K the successive stability
constant and N the highest number of the molecules of the
addendum. All dioximes investigated here are very weak mono-
basic acids. The dissociation of the second NOH group is so
low that several authors ascribe a weak basicity to it. It
may be neglected. The formation curves of all complex compounds
investigated here have the usual appearance (Fig 1). All
these compounds have a common formula MA_2 (A - addendum).
Furthermore symmetrical and asymmetrical dioximes of equal
structure were compared with respect to their stability. A
dioximate which was formed by a symmetrical dioxime was the
Card 2/3   most stable one. The authors draw the following conclusions

The Compounds of Copper, Nickel, and Cobalt With   SOV/156 -58-1-16/46
Several Dioximes

from the results: the stability of nickel, cobalt, and
copper with dioximes changes in the following order: cyclo-
hexandion-dioxime>α-benzyl-dioxime> phenyl-dioxime> α-furyl-
dioxime> α-anisyl-dioxime. There are 4 figures, 3 tables, and
8 references, 3 of which are Soviet.

ASSOCIATION: Kafedra analiticheskoy khimii Moskovskogo gosudarstvennogo uni-
versiteta im.M.V.Lomonosova (Chair of Analytical Chemistry of
the Moscow State University imeni M.V. Lomonosov)

SUBMITTED: September 27, 1957

Card 3/3

$BOCHKOVA, V. M.$

AUTHORS: Bochkova, V. M., Peshkova, V. M.   78-3-5-14/33

TITLE: Aliphatic Oxime Compounds of Cu, Ni and Co (Soyedineniye
             Cu, Ni i Co s oksimami alifaticheskogo ryada)

PERIODICAL: Zhurnal Neorganicheskoy Khimii, 1958, Vol 3, Nr 5, pp 1131-
             -1138 (USSR)

ABSTRACT: The stabilization of the complexes of copper, nickel and
             cobalt was determined, as well as the effect of the struc-
             ture of the organic reagent. The following oximes were
             used: dimethyldioxime, monooxime - diacetyl, dimethyl-
             -dioxime-ether, dimethyl-dioxime, ethyl-methyl-dioxime in
             dioxane-solution. The constants of stabilisation of these
             oximes in 5o per cent dioxane are the following: for dimethyl-
             dioxime (p.K_D = 12,83), for dimethyl-dioxime-ether (p.K_D =
             = 12,77), for monooxime-diacetyl (p.K_D = 11,16), for methyl-
             dioxime (p.K_D = 12,1), for ethyl-methyl-dioxime (p.K_D =
             = 12,86).
             All the enumerated reagents are weak acids. According to
             their stability, all complex compounds of copper, nickel,
             and cobalt in a 50% dioxane-solution can be classified as

Card 1/2